

Curriculum Vitae

Name: S. Bruce King

Title: Professor

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Research Homepage: <http://www.wfu.edu/chemistry/faculty/BruceKing.html>

Wake Forest University

Department of Chemistry

Winston-Salem, NC 27109

Education:

Cornell University, Ithaca, NY, Advisor: Bruce Ganem

Cornell University, Ithaca, NY

West Virginia University, Morgantown, WV

West Virginia University, Morgantown, WV

Ph.D., Organic Chemistry, 1994

M.S., Organic Chemistry, 1990

M.S., Pharmaceutical Sciences, 1988

B.S., Forestry, 1985

Research/Professional Experience:

Director, Wake Forest Comprehensive Cancer Center Synthetic Core Facility, 2007-present

Professor of Chemistry, Wake Forest University, 2006-present

Faculty, Department of Molecular Medicine, Wake Forest University, 2003-present

Associate Professor of Chemistry, Wake Forest University, 2001-2006

Associate, Department of Cancer Biology, Wake Forest University, 2001-present

Assistant Professor of Chemistry, Wake Forest University, 1995-2001

Postdoctoral Fellow, The Scripps Research Institute, (K. Barry Sharpless), 1993-1995

Awards:

Z. Smith Reynolds Foundation Leave, 2008-2009

Z. Smith Reynolds Foundation Leave, 2002-2003

Z. Smith Reynolds Foundation Fellow, Wake Forest University, 2001-2004

Established Investigator of the American Heart Association, 2001-2004

Wake Forest University Award for Excellence in Research, 2000

Henry Dreyfus Teacher-Scholar, 1999-2004

NIH Postdoctoral Fellow, The Scripps Research Institute, 1994-1995

NIH Predoctoral Fellow, Cornell University, 1990-1993

Swiger Predoctoral Fellowship, West Virginia University, 1985-1987

Professional Activities:

Organizer, Wake Forest Nitrogen Oxide Meeting, 2007, 2008 and 2010

Member, Site Visit Panel for the Review of the National Cancer Institutes Laboratory of Comparative Carcinogenesis, May, 2006.

Guest Editor, Serial Review for Free Radicals in Biology and Medicine, "Recent Progress in Nitric Oxide Donation," Spring 2004

American Heart Association Mid-Atlantic/Pennsylvania/Delaware Affiliate Study Section, 2004-2008

NIH Special Study Section-B (Member conflicts in Biophysics and Chemistry), 2003
NIH Bio-Organic and Natural Products Review Panel, Ad Hoc Member, 2000
Member of the American Chemical Society (Division of Organic and Medicinal Chemistry)
Member of the Nitric Oxide Society
Member of the Society for Free Radicals in Biology and Medicine
Member of the Council of Undergraduate Research
Member of the Wake Forest University Comprehensive Cancer Center (WFUCCC)

Invited Book Chapters from Wake Forest University:

2) King, S. B. "C-Nitroso Compounds, Oximes, N-Hydroxyguanidines and N-Hydroxyureas" in *Nitric Oxide Donors: For Pharmaceutical and Biological Application*; Wang, P. G., Cai, T. B., Taniguchi, N. Eds, John Wiley and Sons, 2005, Chapter 7.

1) King, S.B.; Nagasawa, H.T. "Chemical Approaches Toward the Generation of Nitroxyl (HNO)", In *Methods in Enzymology*; Packer, L, Ed.; Academic Press: San Diego, 1998, Vol. 301, Chapter 22.

Research Publications from Wake Forest University:

64) Gorczynski, M. J.; Smitherman, P. K.; Akiyama, T. E; Wood, H. B.; Berger, J. P.; King, S. B.; Morrow, C. S. "Activation of Peroxisome Proliferator-Activated Receptor γ (PPAR γ) by Nitroalkene Fatty Acids: Importance of Nitration Position and Degree of Unsaturation," *J. Med. Chem.* **2009**, *52*, 4631-4639.

63) Miller, T. W.; Cherney, M. M.; Lee, A. J.; Francoleon, N. E.; Farmer, P. J.; King, S. B.; Hobbs, A. J.; Miranda, K. M.; Burstyn, J. N.; Fukuto, J. M. "The Effects of Nitroxyl (HNO) on Soluble Guanylate Cyclase Activity: Interactions at Ferrous Heme and Cysteine Thiols," *J. Biol. Chem.* **2009**, *284*, 21788-21796.

62) Goetz, B.; Wang, P.; Shields, H. W.; Basu, S.; Grubina, R.; Huang, J.; Conradie, J.; Huang, Z.; Jeffers, A.; Jiang, A.; He, X.; Azarov, I.; Seibert, R.; Mehta, A.; Patel, R.; King, S. B.; Hogg, N.; Ghosh, A.; Gladwin, M. T.; Kim-Shapiro, D. B. "Reply to Nitrite-methemoglobin inadequate for hypoxic vasodilation," *Nat. Chem. Biol.*, **2009**, *5*, 367.

61) Reisz, J. A.; Klorig, E. B.; Wright, M. W.; King, S. B. "Reductive Phosphine-Mediate Ligation of Nitroxyl (HNO)," *Organic Letters*, **2009**, *11*, 2719-2721.

60) Bates, D. J. P.; Lively, M. O.; Gorczynski, M. J.; King, S. B.; Townsend, A. J.; Morrow, C. S. "Noncatalytic Interactions between Glutathione S-Transferases and Nitroalkene Fatty Acids Modulate Nitroalkene-Mediated Activation of Peroxisomal Proliferator-Activated Receptor γ ," *Biochemistry*, **2009**, *48*, 4159-4169.

- 59) Alexander, R. L.; Wright, M. W.; Gorczynski, M. J.; Smitherman, P. K.; Akiyama, T. E.; Wood, H. B.; Berger, J. P.; King, S. B.; Morrow, C. S. "Differential potencies of naturally occurring regioisomers of nitrooleic acid in PPAR γ activation," *Biochemistry*, **2009**, 48, 492-8
- 58) Basu, S.; Azarov, N. A.; Font, M. D.; King, S. B.; Hogg, N.; Gladwin, M. T.; Shiva, S.; Kim-Shapiro, D. B. "Nitrite Reductase Activity of Cytochrome C," *J. Biol. Chem.* **2008**, 283, 32590-32597.
- 57) Donzelli, S.; Espey, M. G.; Flores-Santana, W.; Switzer, C. H.; Yeh, G. C.; Huang, J.; Stuehr, D. J.; King, S. B.; Miranda, K. M.; Wink, D. A. "Generation of Nitroxyl by Heme Protein-Mediated Peroxidation of Hydroxylamine but not Hydroxy-L-arginine," *Free Rad. Biol. Med.*, **2008**, 45, 578-584.
- 56) He, X.; Azarov, I.; Jeffers, A.; Presley, T.; Richardson, J.; King, S. B.; Gladwin, M. T.; Kim-Shapiro, D. B. "The Potential of Angeli's Salt to Decrease Nitric Oxide Scavenging by Plasma Hemoglobin," *Free Rad. Biol. Med.*, **2008**, 44, 1420-1432.
- 55) Nelson, K. J.; Day, A. E.; Zeng, B. B.; King, S. B.; Poole, L. B. "Isotope-coded, Iodoacetamide-Based Reagent to Determine Individual Cysteine pKa Values by MALDI-TOF Mass Spectrometry," *Analytical Biochemistry*, **2008**, 375, 187-195.
- 54) Michalek, R. D.; Nelson, K. J.; Holbrook, B. C.; Yi, J. S.; Stridiron, D.; Daniel, L. W.; Fetrow, J. S.; King, S. B.; Poole, L. B.; Grayson, J. S. "The Requirement of Reversible Cysteine Sulfenic Acid Formation for T Cell Activation and Function," *J. Immunol.* **2007**, 179, 6456-6467.
- 53) Poole, L. B.; Klomsiri, C.; Knaggs, S. A.; Furdul, C. M.; Nelson, K. J.; Thomas, M. J.; Fetrow, J. S.; Daniel, L. W.; King, S. B. "Fluorescent and affinity-based tools to detect cysteine sulfenic acid formation in proteins," *Bioconj. Chem.* **2007**, 18, 2004-2007.
- 52) Basu, S.; Grubina, R.; Huang, J.; Conradie, J.; Huang, Z.; Jeffers, A.; Jiang, A.; He, X.; Azarov, I.; Seibert, R.; Mehta, A.; Patel, R.; King, S. B.; Hogg, N.; Ghosh, A.; Gladwin, M. T.; Kim-Shapiro, D. B. "Catalytic Generation of N₂O₃ by the Concerted Nitrite Reductase and Anhydrase Activity of Hemoglobin," *Nat. Chem. Biol.*, **2007**, 3, 785-794.
- 51) Gorczynski, M. J.; Huang, J.; Lee, H.; King, S. B. "Evaluation of Nitroalkenes as NO Donors," *Bioorganic and Medicinal Chemistry Letters*, **2007**, 17, 2013-2017.
- 50) Chakrapani, H.; Gorczynski, M. J.; King, S. B. "Allylic Nitro Compounds as Nitrite Donors," *J. Am. Chem. Soc.* **2006**, 128, 16332-16337.
- 49) Chen, W.; Day, C. S.; King, S. B. "Grignard Reagent-Mediated Conversion of an Acyl Nitroso-Anthracene Cycloadduct to a Nitron," *J. Org. Chem.* **2006**, 71, 9221-9224.
- 48) Donzelli, S.; Switzer, C. H.; Thomas, D. D.; Ridnour, L. A.; Espey, M. G.; Isenberg, J. S.; Tocchetti, C. G.; King, S. B.; Lazzarino, G.; Miranda, K. M.; Roberts, D. D.; Feelisch, M.; Wink,

D. A. "The Activation of Metabolites of Nitric Oxide Synthase by Metals is Both Redox and Oxygen Dependent: A New Feature of Nitrogen Oxide Signaling," *Antioxidants and Redox Signaling* **2006**, *8*, 1363-1371.

47) Sha, X.; Isbell, S.; Patel, R. P. P.; Day, C. S.; King, S. B. "Hydrolysis of Acyl Nitroso Compounds Yields Nitroxyl (HNO)," *J. Am. Chem. Soc.* **2006**, *128*, 9687-9692.

46) Alexander, R. L.; Bates, D. J. P.; Wright, M. W.; King, S. B.; Morrow, C. S. "Modulation of Nitrated Lipid Signaling by Multidrug Resistance Protein 1 (MRP1): Glutathione Conjugation and MRP1-Mediated Efflux Inhibits Nitrooleic Acid-Induced PPAR γ -Dependent Transcription Activation," *Biochemistry*, **2006**, *45*, 7889-7896.

45) Gorczynski, M. J.; Huang, J.; King, S. B. Regio- and Stereospecific Syntheses and Nitric Oxide Donor Properties of (E)-9 and (E)-10-Nitrooctadec-9-enoic Acids, *Org. Lett.*, **2006**, *8*, 2305-2308.

44) Huang, J.; Yakubu, M.; Kim-Shapiro, D. B.; King, S. B. "Rat Liver-Mediated Metabolism of Hydroxyurea to Nitric Oxide," *Free Rad. Biol. Med.*, **2006**, *40*, 1675-1681.

43) Basu, S.; Hill, J. D.; Shields, H.; Huang, J.; King, S. B.; Kim-Shapiro, D. B. "Hemoglobin effects in the Saville Assay," *Nitric Oxide: Biology and Chemistry*, **2006**, *15*, 1-4.

42) Donzelli, S.; Espey, M. G.; Thomas, D. D.; Mancardi, D.; Tocchetti, C. G.; Ridnour, L. A.; Paolucci, N.; King, S. B.; Miranda, K. M.; Lazzarino, G.; Fukuto, J.; Wink, D. A. "Discriminating HNO Formation from Other Reactive Nitrogen Oxide Species," *Free Rad. Biol. Med.*, **2006**, *40*, 1056-1066.

41) Parrish, D. A.; Allen, C. L.; Day, C. S.; Zhou, Z.; King, S. B. "A Convenient Method for the Synthesis of N-Hydroxyureas," *Tetrahedron Lett.* **2005**, *46*, 8841-8843.

40) Poole, L. B.; Zeng, B.; Knaggs, S. A.; Yakubu, M.; King, S. B. "Synthesis of Chemical Probes to Map Sulfenic Acid Modifications in Proteins," *Bioconj. Chem.* **2005**, *16*, 1624-1628.

39) King, S. B. "N-Hydroxyurea and Acyl Nitroso Compounds as Nitroxyl (HNO) and Nitric Oxide (NO) Donors," *Curr. Top. Med. Chem.* **2005**, *5*, 665-673, **invited review**.

38) Azizi, F.; Kielbasa, J. E.; Adeyiga, A. M.; Maree, R. D.; Yakubu, M.; Frazier, M.; Shields, H.; King, S. B.; Kim-Shapiro, D. B. "Rates of Nitric Oxide Dissociation from Hemoglobin," *Free Rad. Biol. Med.*, **2005**, *39*, 145-151.

37) Pennington, R. L.; Sha, X.; King, S. B. "N-Hydroxy Sulfonimidamides as New Nitroxyl (HNO) Donors," *Bioorganic and Medicinal Chemistry Letters*, **2005**, *15*, 2331-2334.

- 36) Zeng, B.; Huang, J.; Wright, M. W.; King, S. B. "Nitroxyl (HNO) Release from New Functionalized N-Hydroxyurea Derived Acyl Nitroso-9, 10-Dimethylanthracene Cycloadducts," *Bioorganic and Medicinal Chemistry Letters*, **2004**, *14*, 5565-5568.
- 35) Lockamy, V. L.; Shields, H.; Kim-Shapiro, D. B.; King, S. B. "Iron Nitrosyl Hemoglobin Formation from the Reaction of Hydroxylamine and Hemoglobin under Physiological Conditions," *Biochimica et Biophysica Acta*, **2004**, *1674*, 260-267.
- 34) King, S. B. "Nitric Oxide Production from Hydroxyurea," *Free. Rad. Biol. Med.*, **2004**, *37*, 737-744, **invited review**.
- 33) King, S. B. "Mechanisms and Novel Directions in the Biological Applications of Nitric Oxide Donors," *Free Rad. Biol. Med.*, **2004**, *37*, 735-736.
- 32) Huang, J.; Kim-Shapiro, D. B.; King, S. B. "Catalase-Mediated Nitric Oxide Formation From Hydroxyurea," *J. Med. Chem.*, **2004**, *47*, 3495-3501.
- 31) Xu, X.; Cho, M.; Spencer, N. Y.; Patel, N.; Huang, Z.; Shields, H.; Kings, S. B.; Gladwin, M. T.; Hogg, N.; Kim-Shapiro, D. B. "Measurements of Nitric Oxide on the Heme Iron and β -93 Thiol of Human Hemoglobin During Cycles of Oxygenation and Deoxygenation," *Proc. Natl. Acad. Sci.* **2003**, *100*, 11303-11308.
- 30) Huang, Z.; Hearne, L.; Irby, C. E.; King, S. B.; Ballas, S. K.; Kim-Shapiro, D. B. "Kinetics of Increased Deformability of Deoxygenated Sick Cells Upon Oxygenation," *Biophysical Journal*, **2003**, *85*, 2374-2383.
- 29) Huang, J.; Zou, Z.; Kim-Shapiro, D. B.; Ballas, S. K.; King, S. B., "Hydroxyurea Analogs as Kinetic and Mechanistic Probes of the Nitric Oxide Producing Reactions of Hydroxyurea and Oxyhemoglobin," *J. Med. Chem.*, **2003**, *46*, 3748-3753.
- 28) Lockamy, V. L.; Huang, J.; Shields, H.; Ballas, S. K.; King, S. B.; Kim-Shapiro, "Urease Enhances the Formation of Iron Nitrosyl Hemoglobin in the Presence of Hydroxyurea," *Biochimica et Biophysica Acta* **2003**, *1622*, 109-116.
- 27) Cohen, A. D.; Zeng, B.; King, S. B.; Toscano, J. P. "Direct Observation of an Acyl Nitroso Species in Solution by Time-Resolved IR Spectroscopy," *J. Am. Chem. Soc.* **2003**, *125*, 1444-1445.
- 26) King, S. B. "The Nitric Oxide Producing Reactions of Hydroxyurea, *Current Medicinal Chemistry*, **2003**, *10*, 437-452, **invited review**.
- 25) King, S. B. "A Role for Nitric Oxide in Hydroxyurea-Mediated Fetal Hemoglobin Induction," *J. Clin. Invest.* **2003**, *111*, 171-172, **invited commentary**.

- 24) Zeng, B.; King, S. B. "Palladium Catalyzed Synthesis of Water-Soluble Symmetric 9,10-Disubstituted Anthracenes," *Synthesis*, **2002**, 2335-2337.
- 23) Xu, X.; Lockamy, V. L.; Chen, K.; Huang, Z.; Shields, H.; King, S. B.; Ballas, S. K.; Nichols, J. S.; Gladwin, M. T.; Noguchi, C. T.; Schechter, A. N.; Kim-Shapiro, D. B. "Effects of Iron Nitrosylation on Sick Cell Hemoglobin Solubility," *J. Biol. Chem.*, **2002**, 277, 36787-36792.
- 22) Ware, R. W., Jr.; Day, C. S.; King, S. B. "Diastereoselective and Intramolecular Cycloadditions of Asymmetric P-Nitroso Phosphine Oxides," *J. Org. Chem.*, **2002**, 67, 6174-6180.
- 21) Ellis, J.M.; King, S.B. "Ring-opening cross metathesis of 1, 3-cyclopentadiene-heterodienophile cycloadducts to produce cyclic hydrazines and hydroxylamines," *Tetrahedron Lett.*, **2002**, 43, 5833-5835.
- 20) Huang, Z.; Ucer, K.B.; **Murphy, T.**; Williams, R.T.; King, S.B.; Kim-Shapiro, D. B. "Kinetics of Nitric Oxide Binding to R-State Hemoglobin," *Biochemical and Biophysical Research Communications*, **2002**, 292, 812-818.
- 19) Huang, J.; Sommers, E.; Kim-Shapiro, D. B.; King, S. B. "Horseradish Peroxidase Catalyzed Nitric Oxide Formation from Hydroxyurea," *J. Am. Chem. Soc.*, **2002**, 124, 3473-3480.
- 18) Huang, J.; Hadimani, S. B.; Rupin, J. W.; Ballas, S. K.; Kim-Shapiro, D. B.; King, S. B. "Iron Nitrosyl Hemoglobin Formation from the Reactions of Hemoglobin and Hydroxyurea," *Biochemistry*, **2002**, 41, 2466-2474.
- 17) Huang, Z.; Louderback, J.G.; Goyal, M.; Azizi, F.; King, S. B.; Kim-Shapiro, D. B. "Nitric Oxide Binding to Oxygenated Hemoglobin Under Physiological Conditions," *Biochimica et Biophysica Acta*, **2001**, 1568, 252-260.
- 16) Huang, Z.; Louderback, J. G.; King, S. B.; Ballas, S. K.; Kim-Shapiro, D. B. "In Vitro Exposure to Hydroxyurea Reduces Sick Red Blood Cell Deformability" *Am. J. Hematol.*, **2001**, 67, 151-156.
- 15) Li, X.; Atkinson, R. N.; King, S. B. "Synthesis and Evaluations of New L-Canavanine Derivatives as Inhibitors of Nitric Oxide Synthase, *Tetrahedron*, **2001**, 57, 6557-6565, **invited contribution to a Symposium-in-Print.**
- 14) Ware, R. W., Jr.; King, S. B. "Evaluation of New L-Thiocitrulline Derivatives as Inhibitors of Nitric Oxide Synthase," *Bioorganic and Medicinal Chemistry Letters*, **2000**, 10, 2779-2781.
- 13) Ware, R. W., Jr.; King, S. B. "P-Nitroso Phosphate Compounds: New N-O Heterodienophiles and Nitroxyl Delivery Agents," *J. Org. Chem.* **2000**, 65, 8725-8729.

- 12) Xu, Y.; Alavanja, M.M.; Johnson, V.L.; Yasaki, G.; King, S.B. "Production of Nitroxyl (HNO) at Biologically Relevant Temperatures from the retro-Diels Alder Reaction of N-Hydroxyurea Derived Acyl Nitroso-9, 10-Dimethylantrhacene Cycloadducts," *Tetrahedron Lett.* **2000**, *41*, 4265-4269.
- 11) Yasaki, G.; Xu, Y.; King, S.B. "An Efficient Synthesis of ¹⁵N-Hydroxyurea," *Synthetic Communications*, **2000**, *30*, 2041-2047
- 10) Jenkins, N.E.; Ware, Jr., R.W.; Atkinson, R.N., King, S.B. "Generation of Acyl Nitroso Compounds by the Oxidation of N-Acyl Hydroxylamines with the Dess Martin Periodinane," *Synthetic Communications*, **2000**, *30*, 947-953.
- 9) Rupin, J.W.; Domingo, S.R.; Smith, S.V.; Gummadi, B.K.; Shields, H.; Ballas, S.K.; King, S.B.; Kim-Shapiro, D.B. "The Reactions of Myoglobin, Normal Adult Hemoglobin, Sick Cell Hemoglobin and Hemin with Hydroxyurea," *Biophysical Chem.* **2000**, *84*, 1-11.
- 8) Atkinson, R.N.; King, S.B. "Guanidine Substituted Imidazoles as Inhibitors of Nitric Oxide Synthase," *Bioorganic and Medicinal Chemistry Letters*, **1999**, *9*, 2953-2958.
- 7) Kim-Shapiro, D.B.; King, S.B.; Shields, H.; Kolibash, C.P.; Gravatt, L.; Ballas, S.K. "The Reaction of Deoxy-Sickle Cell Hemoglobin with Hydroxyurea," *Biochimica et Biophysica Acta*, **1999**, *1428*, 381-387.
- 6) Ware, Jr., R.W.; King, S.B. "N-Phosphinoylnitroso Compounds: New Asymmetric N-O Heterodienophiles and Nitroxyl Delivery Agents," *J. Am. Chem. Soc.* **1999**, *121*, 6769-6770.
- 5) Atkinson, R.N.; Moore, L.; Tobin, J.; King, S.B. "Asymmetric Synthesis of Conformationally Restricted L-Arginine Analogs as Active Site Probes of Nitric Oxide Synthase," *J. Org. Chem.*, **1999**, *64*, 3467-3475.
- 4) Ichimori, K.; Stuehr, D.J.; Atkinson, R.N.; King, S.B. "Synthesis and Evaluation of New Sulfur Containing L-Arginine Derived Inhibitors of Inducible Nitric Oxide Synthase," *J. Med. Chem.* **1999**, *42*, 1842-1848.
- 3) Xu, Y.; Mull, C.D.; Bonifant, C.L.; Yasaki, G.; Palmer, E.C.; Shields, H.; Ballas, S.K.; Kim-Shapiro, D.B.; King, S.B. "Nitrosylation of Sick Cell Hemoglobin by Hydroxyurea," *J. Org. Chem.*, **1998**, *63*, 6452-6453.
- 2) Kim-Shapiro, D.B.; King, S.B.; Bonifant, C.L.; Kolibash, C.P. Ballas, S.K. "Time Resolved Absorption Study of the Reaction of Hydroxyurea with Sick Cell Hemoglobin," *Biochimica et Biophysica Acta*, **1998**, *1380*, 64-74.
- 1) Atkinson, R.N., Storey, B.M., King, S.B. "Reactions of Acyl Nitroso Compounds with Amines: Production of Nitroxyl with the Preparation of Amides," *Tetrahedron Lett.* **1996**, *37*, 9287-9290.

Patents

PCT/US2008/009979, Chemotherapeutics for Inducing an MSH2-Dependent Apoptotic Pathway, Scarpinato, Salsbury and King

PCT/US2008/010950, Methods for the Treatment of Hemolysis, Kim-Shapiro, King, Sweeney, Gladwin

WO 2007/120830, C-Nitroso-Derived Nitroxyl Donors, King

US 7294748, Sulfenic Acid-Reactive Compounds and Their Methods of Synthesis, Poole, King and Fetrow

Previous Publications:

7) King, S.B.; Stratford, E.S.; Craig, C.R.; Fifer, E.K. "Synthesis and Pharmacological Evaluation of Spiro-Analogues of 5-Benzyl-5-Ethyl Barbituric Acid," *Pharmaceutical Research*, **1995**, *12*, 1240-1243.

6) Becker, H.B.; King, S.B.; Tanaguchi, M.; Vanhessche, K.P.M.; Sharpless, K.B. "New Ligands and Improved Enantioselectivities for the Asymmetric Dihydroxylation of Olefins," *J. Org. Chem.*, **1995**, *60*, 3940-3941.

5) King, S.B.; Sharpless, K.B. "An Efficient Synthesis of Enantiomerically Pure *trans*-2-Phenylcyclohexanol," *Tetrahedron Lett.* **1994**, *35*, 5611-5612.

4) Walsh, P.J.; Ho, P.T.; King, S.B.; Sharpless, K.B. "Asymmetric Dihydroxylation of Olefins Containing Sulfur: Chemoselective Oxidation of C-C Double Bonds in the Presence of Sulfides, 1,3-Dithianes, and Disulfides," *Tetrahedron Lett.* **1994**, *35*, 5129-5132.

3) King, S.B.; Ganem, B. "Synthetic Studies on Mannostatin A and Its Derivatives: A New Family of Glycoprotein Processing Inhibitors," *J. Am. Chem. Soc.* **1994**, *116*, 562-570.

2) Yoon, H.; King, S.B.; Ganem, B. "Synthesis of 1- β -Amino-1-Deoxynojirimycins: A New Family of Glucosidase Inhibitors," *Tetrahedron Lett.* **1991**, *32*, 7199-7202.

1) King, S.B.; Ganem, B. "Enantioselective Synthesis of Mannostatin A: A New Glycoprotein Processing Inhibitor," *J. Am. Chem. Soc.* **1991**, *113*, 5089-5090.

Invited Research Presentations:

31) Chemistry Department Seminar, Washington State University, April 5, 2009

- 30) Plenary Speaker, Nitric Oxide Gordon Conference, Il Ciocco Hotel/Resort, Barga, Italy, March 1-6, 2009
- 29) Chemistry Department Seminar, Appalachian State University, April 4, 2008
- 28) Chemistry Department Seminar, Winston-Salem State University, February 20, 2008
- 27) Chemistry Department Seminar, Johns Hopkins University, November 27, 2007.
- 26) Invited Speaker at the Rocky Mountain Regional Meeting of the American Chemical Society, "Organic Compounds as New Sources of Nitric Oxide (NO)," *Abstract of Papers*, 19th Rocky Mountain Regional Meeting of the American Chemical Society, Tucson, AZ, American Chemical Society, Washington, D.C. 2006, Abstract 264.
- 25) Plenary Speaker, Fourth International Conference on the Biology, Chemistry, and Therapeutic Applications of Nitric Oxide, Monterey, California, June 25-29, 2006.
- 24) Wake Forest University Hypertension and Vascular Disease Center Seminar Series, April 28, 2006.
- 23) Cancer Redox Biology Workshop, National Institutes of Health, April 25, 2006
- 22) Chemistry Department Seminar, College of William and Mary, April 15, 2005.
- 21) Chemistry Department Seminar, Western Carolina University, March 18, 2005.
- 20) Chemistry Department Seminar, Davidson College, February 18, 2005.
- 19) Medicinal Chemistry Department, School of Pharmacy, University of North Carolina at Chapel Hill, December 9, 2004.
- 18) Plenary Speaker, Summer Meeting of the Society of Free Radical Research-Europe, University of Łódź, Poland, July 2-5, 2004
- 17) Invited Participant in the Mesilla Workshop on the Chemistry of NO in Biological Signaling, Mesilla, NM, January 31-February 4, 2004 (*Chemical and Engineering News*, **2004**, 82 (10) 39-44).
- 16) Chemistry Department Seminar, North Carolina A&T University, December 4, 2003,
- 15) Biochemistry Department Seminar, Virginia Tech, September 22, 2003
- 14) Chemistry Department Seminar, Elizabeth City State University, April 3, 2003

- 13) Molecular Medicine Department Seminar, Wake Forest University School of Medicine, March 28, 2003
- 12) Chemistry Department Seminar, University of Pennsylvania, November 19, 2001.
- 11) Chemistry Department Seminar, University of North Carolina at Chapel Hill, November 15, 2001.
- 10) 2001 Benjamin Franklin Medal in Chemistry Awards Program honoring K. Barry Sharpless, University of Delaware, April 26, 2001.
- 9) Chemistry Department Seminar, University of Toledo, January 20, 2000
- 8) Chemistry Department Seminar, Wayne State University, January 19, 2000
- 7) The Oxidative Stress and Free Radical Faculty Seminar Series, National Institute of Environmental Health Sciences, Research Triangle Park, NC, December 3, 1998
- 6) Chemistry Department Seminar, Elon College, November 20, 1998
- 5) Plenary Speaker, Third International Conference on the Biochemistry and Molecular Biology of Nitric Oxide, University of California, Los Angeles, July 15, 1998
- 4) Chemistry Department Seminar, Claflin College, February 14, 1998
- 3) Chemistry Department Seminar, University of North Carolina at Greensboro, January 30, 1998
- 2) Chemistry Department Seminar, Erskine College, March 14, 1997
- 1) Chemistry Department Seminar, Appalachian St. University, March 15, 1996

Presentations at Professional Meetings:

- 66) Banerjee, R.; King, S. B. "New Synthetic Approaches Towards The Natural Hydroxamic Acid Cobactin Core," 41st National Organic Symposium, June 7-11, 2009, Boulder, CO.
- 65) DuMond, J.; King, S. B. "Acyloxy Nitroso Compounds as a Possible Treatment of Heart Failure and Their Interactions with Thiols," Carolina Biotechnology Conference, Charlotte, NC, October 29, 2008.
- 64) Poole, B.P.; King, S. B. "Simple Alkenes as Nitric Oxide Vehicles Through Nitro-Oximes," *Abstract of Papers*, 235th National Meeting of the American Chemical Society, New Orleans, LA, American Chemical Society, Washington, D.C., 2008, CHD 318

- 63) Klorig, E. B.; Klomsiri, C.; Knaggs, S. A.; Nelson, K. J.; Poole, L. B.; King, S. B. "Approaches for Distinguishing Protein Sulfenic Acids and S-Nitrosothiols," 14th Annual Meeting of the Society of Free Radicals in Biology and Medicine, Washington, DC, November 14-218, 2007
- 62) Gorczynski, M. J.; Bates, D. J. P.; Morrow, C. S.; King, S. B. "Nitrated Fatty Acids: Their Synthesis, PPAR γ Activation, and Glutathione Conjugation," 40th National Organic Symposium, June 3-7, 2007, Durham, NC.
- 61) Bannerjee, R.; King, S. B. "A New Synthetic Route to Cyclic Hydroxamic Acids," 40th National Organic Symposium, June 3-7, 2007, Durham, NC.
- 60) Lubbeck, J. L., King, S. B. "Synthesis and evaluation of nitroxyl releasing compounds," *Abstract of Papers*, 233rd National Meeting of the American Chemical Society, Chicago, IL, American Chemical Society, Washington, D.C., 2007, CHD.
- 59) Feneran, A.; King, S.B. "Synthesis of a Spontaneous Nitrite Donor," *Abstract of Papers*, 233rd National Meeting of the American Chemical Society, Chicago, IL, American Chemical Society, Washington, D.C., 2007, CHD 706.
- 58) Klomsiri, C.; Nelson, K. J.; Knaggs, S. A.; King, S. B.; Poole, L. B. "Methods to Monitor Cysteine Sulfenic Acid Formation in Peroxide Responsive Protein," Nitric Oxide Gordon Research Conference, Ventura, California, February, 2007.
- 57) Chakripani, H.; King, S. B. "Allylic Nitro Compounds as Sources of Nitrite," Fourth International Conference on the Biology, Chemistry, and Therapeutic Applications of Nitric Oxide, Monterrey, California, June 25-29, 2006.
- 56) Huang, J.; Shields, H.; Maree, R.; Kim-Shapiro, D. B.; King, S. B. "NO Donor Properties of Ferrous Catalase-NO Complex," Fourth International Conference on the Biology, Chemistry, and Therapeutic Applications of Nitric Oxide, Monterrey, California, June 25-29, 2006.
- 55) Gorczynski, M. J.; Huang, J.; King, S. B. "Regio- and stereospecific Syntheses and Nitric Oxide Donor Properties of (E)-9 and (E)-10-nitrooctadec-9-enoic acids," Fourth International Conference on the Biology, Chemistry, and Therapeutic Applications of Nitric Oxide, Monterrey, California, June 25-29, 2006.
- 54) Sha, X.; King, S. Bruce, "Synthesis and evaluation of α -Acetoxy Nitroso compounds as new nitroxyl donors," *Abstract of Papers*, 231st National Meeting of the American Chemical Society, Atlanta, GA, American Chemical Society, Washington, D.C., 2006, MED 28.
- 53) Huang, J.; Basu, S.; Huang, Z.; Hill, J.; Shields, H.; Azarov, I.; Huang, K. T.; Hogg, N.; King, S. B.; Gladwin, M. T.; Kim-Shapiro, D. B. "Nitrosothiol Formation in the Reaction of Nitrite and Hemoglobin," 12th Annual Meeting of the Society of Free Radicals in Biology and Medicine, Austin, TX, November 16-20, 2005.

- 52) Sha, X.; King, S. B. "Synthesis and Evaluation of New Nitroxyl Donors," 12th Annual Meeting of the Society of Free Radicals in Biology and Medicine, Austin, TX, November 16-20, 2005.
- 51) Pennington, R. L., Sha, X.; Huang, J.; Skolimowski, J.; King, S. B. "Synthesis and Evaluation of New Donors of Nitroxyl (HNO)," Nitric Oxide Gordon Research Conference, Il Ciocco, Italy, May, 2005.
- 50) Huang, J.; Kim-Shapiro; King, S.B. "Metabolism of Hydroxyurea to Nitric Oxide by Rat Liver," 11th Annual Meeting of the Society of Free Radicals in Biology and Medicine, St. Thomas, U.S. Virgin Islands, November 18-21, 2004.
- 49) Feneran, A.; King, S. B. "Synthesis of a Spontaneous Nitrite Donor," *Abstract of Papers*, 56th Southeast Regional Meeting of the American Chemical Society, Research Triangle Park, NC, American Chemical Society, Washington, D.C. 2004, CHD 785.
- 48) Hardison, S. A.; King, S. B. "Synthesis of Carbohydrate Derived Hydroxamic Acids as Potential Anti-Cancer Agents," *Abstract of Papers*, 56th Southeast Regional Meeting of the American Chemical Society, Research Triangle Park, NC, American Chemical Society, Washington, D.C. 2004, CHD 878.
- 47) Davis, T.; King, S. B. "Synthesis of Novel Nitric Oxide Donors," *Abstract of Papers*, 56th Southeast Regional Meeting of the American Chemical Society, Research Triangle Park, NC, American Chemical Society, Washington, D.C. 2004, CHD 790.
- 46) Day, A.E.; Johnson, K. J.; King, S. B.; Poole, L. B. "Determination of Cysteine Thiol pKa's in *E. Coli* Thioredoxin Using MALDI-TOF Mass Spectrometry," *Abstract of Papers*, 56th Southeast Regional Meeting of the American Chemical Society, Research Triangle Park, NC, American Chemical Society, Washington, D.C. 2004, CHD 846.
- 45) Zeng, B.; Pennington, R.; Sha, X.; Huang, J.; Wright, M.; King, S.B. "Synthesis and Evaluation of New Donors of Nitroxyl (HNO), a Potential Cardioprotective Agent," American Heart Association 2004 Research Symposium, New Orleans, LA, November 6, 2004.
- 44) Sha, X.; King, S. B. "Syntheses of hydroxamic acid based siderophore analogs as potential inhibitors of siderophore biosynthesis," *Abstract of Papers*, 227th National Meeting of the American Chemical Society, Anaheim, CA, American Chemical Society, Washington, D.C., 2004, MED 77.
- 43) Zou, Z.; King, S. B. "Water-soluble N-hydroxyureas as New Nitric Oxide Donors," *Abstract of Papers*, 227th National Meeting of the American Chemical Society, Anaheim, CA, American Chemical Society, Washington, D.C., 2004, MED 238.

- 42) Allen, C. L.; King, S. B. "Development of an Improved Method for the Synthesis of Polyhydroxyureas," *Abstract of Papers*, 55th Southeast Regional Meeting of the American Chemical Society, Atlanta, GA, American Chemical Society, Washington, D.C. 2003, CHD.
- 41) Huang, J.; Brown, B. A., II; King, S.B. "Potential Nitric Oxide Producing Reactions of *E. coli* Ribonucleotide Reductase with Hydroxyurea," 10th Annual Meeting of the Society of Free Radicals in Biology and Medicine, Seattle, WA, November 20-24, 2003.
- 40) Yakubu, M.; Kim-Shapiro, D. B.; King, S.B. "Approaches to the Identification of Hydroxylamine and other Nitric Oxide Species from the Metabolism of Hydroxyurea," 10th Annual Meeting of the Society of Free Radicals in Biology and Medicine, Seattle, WA, November 20-24, 2003.
- 39) Zou, Z.; King, S. B. "Carbohydrate-Derived N-Hydroxyureas as New Nitric Oxide Donors," *Abstract of Papers*, 226th National Meeting of the American Chemical Society, New York, NY, American Chemical Society, Washington, D.C., 2003, MED 324.
- 38) Parrish, D. A.; King, S. B. "Fructose-Derived N-Hydroxyureas as Novel Therapeutic Agents for Breast Cancer," *Abstract of Papers*, 225th National Meeting of the American Chemical Society, New Orleans, LA American Chemical Society, Washington, D.C., 2003, MED78.
- 37) Sperry, M.; Parrish, D.; Zeng, B.; Huang, J.; King, S. B. "Recent Advances in the Development of Hydroxyurea-Derived Nitric Oxide Donors" Nitric Oxide Gordon Research Conference, Ventura, CA, February 9-13, 2003.
- 36) Huang, J.; Kim-Shapiro, D. B.; King, S. B. "Catalase Mediated Nitric Oxide Release from Hydroxyurea," 9th Annual Meeting of the Oxygen Society, San Antonio, TX, November 20-24, 2002.
- 35) Huang, J.; Lockamy, V.L.; Kim-Shapiro, D. B.; King, S. B. "Comparison of Nitrite and Nitrate Production from Hydroxyurea upon Treatment with Various Biological Oxidants," 9th Annual Meeting of the Oxygen Society, San Antonio, TX, November 20-24, 2002.
- 34) Yakubu, M.; King, S.B. "Synthesis, Characterization and Chemical Studies on S-Nitroso Compounds," *Abstract of Papers*, 54th Southeast Regional Meeting of the American Chemical Society, Charleston, SC, American Chemical Society, Washington, D.C. 2002, MED 664.
- 33) Zou, Z.; Parrish, D.A.; King, S.B. "Carbohydrate Derived N-Hydroxyureas as New Nitric Oxide Donors," *Abstract of Papers*, 54th Southeast Regional Meeting of the American Chemical Society, Charleston, SC, American Chemical Society, Washington, D.C. 2002, MED 248.
- 32) Heyward, S. D.; King, S.B. "Synthesis and Evaluation of Non-Amino Acids Designed to Interact with Nitric Oxide Synthase," *Abstract of Papers*, 54th Southeast Regional Meeting of the American Chemical Society, Charleston, SC, American Chemical Society, Washington, D.C. 2002, MED 247.

- 31) Huang, J.; Zou, Z.; Kim-Shapiro, D. B.; King, S. B. "Mechanism and Kinetics of the Reactions of Hydroxyurea Derivatives with Hemoglobin," *Abstract of Papers*, 224th National Meeting of the American Chemical Society, Boston, MA, American Chemical Society, Washington, D.C., 2002, BIO 154.
- 30) Zeng, B. B.; King, S. B. "Water Soluble Anthracene-Acyl Nitroso Cycloadducts as Nitroxyl Precursors via Retro Diels Alder Reactions," *Abstract of Papers*, 224th National Meeting of the American Chemical Society, Boston, MA, American Chemical Society, Washington, D.C., 2002, Med 400.
- 29) Ellis, J. M.; King, S.B. "Ring Opening Cross Metathesis of 1, 3-Cyclopentadiene-Heterodienophile Cycloadducts To Produce Cyclic Hydrazines and Hydroxylamines," Organic Reactions and Processes Gordon Research Conference, Bristol, RI, July 20-26, 2002.
- 28) Huang, J.; Zou, Z.; Kim-Shapiro, D. B.; King, S. B. "Reactions of Hemoglobin with Hydroxyurea Derivatives," 8th Annual Meeting of the Oxygen Society, Research Triangle Park, NC, November 15-19, 2001.
- 27) Sommers, E. M.; Huang, J.; King, S. B. "Horseradish Peroxidase Catalyzed Production of Nitric Oxide from Hydroxyurea," 8th Annual Meeting of the Oxygen Society, Research Triangle Park, NC, November 15-19, 2001.
- 26) Huang, J.; Kim-Shapiro, D. B.; King, S. B. "Reactions of Hydroxyurea with Hemoglobin," *Abstract of Papers*, 222nd National Meeting of the American Chemical Society, Chicago, IL, American Chemical Society, Washington, D.C., 2001, BIO 81.
- 25) Zou, Z.; Huang, J.; King, S. B. "N-Hydroxyureas as New Nitric Oxide Donors," *Abstract of Papers*, 222nd National Meeting of the American Chemical Society, Chicago, IL, American Chemical Society, Washington, D.C., 2001, BIO 77.
- 24) Sommers, E. M.; King, S.B. "Horseradish Peroxidase Catalyzed Production of Nitric Oxide from Hydroxyurea," *Abstract of Papers*, 221st National Meeting of the American Chemical Society, San Diego, CA, American Chemical Society, Washington, D.C., 2001, CHD 599.
- 23) Ellis, J. M.; King, S.B. "Ring Opening Metathesis of Heteroatom Containing Cycloadducts of Cyclopentadiene," *Abstract of Papers*, 221st National Meeting of the American Chemical Society, San Diego, CA, American Chemical Society, Washington, D.C., 2001, CHD 268.
- 22) Li, X.; King, S.B. "Synthesis and Evaluation of New L-Canavanine Derivatives as Substrates and Inhibitors of Nitric Oxide Synthase," Gordon Research Conference on Nitric Oxide, Ventura, CA, February 4-9, 2001.

- 21) King, S.B.; Kim-Shapiro, D.B.; Ballas, S. "Nitrosylation of Sickle Cell Hemoglobin by Hydroxyurea," Workshop on Nitric Oxide as a Potential Therapeutic Agent for Sickle Cell Disease and other Vascular Diseases, National Institutes of Health, September 5-6, 2000.
- 20) Ware, R. W. Jr.; King, S.B. "Examining the Stereoselectivity of N-Phosphinoylnitroso Compound Cycloadditions," *Abstract of Papers*, 220th National Meeting of the American Chemical Society, Washington, D.C., American Chemical Society, Washington, D.C. 2000, ORGN 558.
- 19) McGeehan, E.; King, S. B. "Horseradish Peroxidase Catalyzed Oxidation of Hydroxyurea: Evidence for Nitroxyl (HNO) and Nitric Oxide Production," First International Conference on the Biology, Chemistry, and Therapeutic Applications of Nitric Oxide, San Francisco, CA, June, 3-7, 2000.
- 18) King, S.B. "Hemoglobin Mediated Nitric Oxide Release from Hydroxyurea," American Heart Association 2000 Research Symposium, Dallas, TX, May 6, 2000.
- 17) King, S.B.; Kim-Shapiro, D.B.; Shields, H.; Rupon, J.; Gravatt, L.; Domingo, S.; Smith, S. "A Role for Nitric Oxide in the Nitrosylation of Sickle Cell Hemoglobin," 6th Annual Meeting of the Oxygen Society, New Orleans, LA, November 18-22, 1999.
- 16) Ware, R.W., Jr.; King, S.B. "Synthesis and Evaluation of New Phosphorus Containing L-Arginine Derivatives," *Abstract of Papers*, 51st Southeast Regional Meeting of the American Chemical Society, Knoxville, TN, American Chemical Society, Washington, D.C. 1999, ORGN 347.
- 15) King, S.B.; Rupon, J.; Kim-Shapiro, D.B; Shields, H.; Domingo, S.; Smith, S. "Reactions of Hydroxyurea with Hemoglobin," *Abstract of Papers*, 51st Southeast Regional Meeting of the American Chemical Society, Knoxville, TN, American Chemical Society, Washington, D.C. 1999, MEDI 319.
- 14) Xu, Y.; Bonifant, C.L.; King, S.B. "Chemical and Biological Oxidation of N-Hydroxyureas with Nitroxyl Production," Gordon Research Conference on Nitric Oxide, Ventura, CA, February 7-12, 1999.
- 13) Atkinson, R.N.; King, S.B. "Syntheses and Evaluation of New Imidazole Containing Inhibitors of Nitric Oxide Synthase," Gordon Research Conference on Nitric Oxide, Ventura, CA, February 7-12, 1999.
- 12) Xu, Yueping, King, S.B. "Nitroxyl Release From C-Nitrosoformamides," *Abstract of Papers*, 50th Southeast Regional Meeting of the American Chemical Society, Raleigh, NC, American Chemical Society, Washington, D.C. 1998, ORGN 425.
- 11) Ware, R.W., Jr.; King, S.B. "N-Phosphinoylnitroso Compounds as New N-O Heterodienophiles and Nitroxyl Releasing Agents," *Abstract of Papers*, 50th Southeast Regional

Meeting of the American Chemical Society, Raleigh, NC, American Chemical Society, Washington, D.C. 1998, ORGN 401.

10) Atkinson, R.N.; Ichimori, K.; Stuehr, D.J.; King, S.B. "Synthesis and Evaluation of New Sulfur Containing L-Arginine Derived Inhibitors of Nitric Oxide Synthase," *Abstract of Papers*, 216th National Meeting of the American Chemical Society, Boston, MA, American Chemical Society, Washington, D.C.' 1998, MEDI 26.

9) Atkinson, R.N.; King, S.B. "Synthesis and Biochemical Evaluation of New Imidazole Containing Compounds Designed to Interact with Nitric Oxide Synthase," *Abstract of Papers*, 216th National Meeting of the American Chemical Society, Boston, MA, American Chemical Society, Washington, D.C.' 1998, MEDI 85.

8) Ware, R.W., Jr.; King, S.B. "N-Phosphinoylnitroso Compounds as New N-O Heterodienophiles and Nitroxyl Releasing Agents," *Abstract of Papers*, 216th National Meeting of the American Chemical Society, Boston, MA, American Chemical Society, Washington, D.C.' 1998, ORGN 413.

7) Atkinson, R.N.; King, S.B. "Synthesis and Evaluation of Conformationally Restricted Aromatic L-Amino Acids Designed to Interact with Nitric Oxide Synthase," *Abstract of Papers*, 215th National Meeting of the American Chemical Society, Dallas, TX, American Chemical Society, Washington, D.C.; 1998, MEDI 72.

6) Palmer, E.C.; Alavanja, M.M.; Yasaki, G.; King, S.B. "Retro Diels Alder Reactions of C-Nitrosoformamide-9,10 Dimethylanthracene Cycloadducts: Production of Nitroxyl (HNO)," *Abstracts of Papers*, 49th Southeast Regional Meeting of the American Chemical Society, Roanoke, VA; American Chemical Society: Washington, D.C., 1997, ORGN 361.

5) Ware, R.W., Jr.; Xu, Yueping; Bonifant, C.L.; Kim-Shapiro, D.B.; King, S.B. "Chemical Oxidation of Hydroxyurea," *Abstracts of Papers*, 49th Southeast Regional Meeting of the American Chemical Society, Roanoke, VA; American Chemical Society: Washington, D.C., 1997, ORGN 176.

4) Atkinson, R.N.; King, S.B. "Syntheses and Evaluation of L-Arginine Derivatives Designed to Interact with Nitric Oxide Synthase," *Abstracts of Papers*, 49th Southeast Regional Meeting of the American Chemical Society, Roanoke, VA; American Chemical Society: Washington, D.C., ORGN 154.

3) King, S.B. "New Approaches Toward the Generation and Delivery of Nitroxyl (HNO)," Gordon Research Conference on Nitric Oxide, Ventura, CA, February 2-7, 1997.

2) Atkinson, R.N.; Storey, B.M.; King, S.B. "Reactions of Acyl Nitroso Compounds with Amines: Preparation of Amides with the Production of Nitroxyl," *Abstracts of Papers*, 48th Southeast Regional Meeting of the American Chemical Society, Greenville, SC; American Chemical Society: Washington, D.C., 1996, ORGN 258.

1) Atkinson, R.N.; Storey, B.M.; Palmer, E.C.; King, S.B. "Synthesis and Evaluation of N-Hydroxyureas and N-Hydroxythioureas as Potential Nitroxyl Delivery Agents," *Abstracts of Papers*, 48th Southeast Regional Meeting of the American Chemical Society, Greenville, SC; American Chemical Society: Washington, D.C., 1996, BIOCHEM 149.

Funded Extra-University Proposals:

Active

1) National Institutes of Health HL 62198, "The Nitric Oxide and Nitroxyl Producing Reactions of Hydroxyurea and Related Compounds," \$250,000 direct costs, 7/09-7/11.

2) Petroleum Research Fund (PRF 48660-AC1, King, PI), \$50,000/year direct costs, 7/1/08-8/31/10, "Synthesis of Hydroxamic Acids through -NOH Insertion of Ketones"

Completed

6) American Heart Association, "Synthesis and Evaluation of L-Arginine Derivatives as Mechanistic Probes of Nitric Oxide Synthase," \$300,000, 1/01-12/04

5) The Camille and Henry Dreyfus Foundation, "Bio-organic Chemistry of N-Hydroxyureas and Related Compounds," \$60,000, 1/00-12/04.

4) Department of the Army, "Fructose Derived N-Hydroxyureas as Novel Therapeutic Agents for Breast Cancer," \$66,500, 7/01-7/02.

3) National Institutes of Health (HL 62198), "The Reaction of Hydroxyurea with Sickle Cell Hemoglobin," \$573,191,10/00-9/03.

2) American Chemical Society/Petroleum Research Fund, "N-Phosphinoylhydroxylamines as New Nitric Oxide and Nitroxyl Delivery Agents" \$20,000, 7/1/98-7/1/00

1) American Heart Association, "Nitric Oxide Synthase Activated N-Hydroxyurea and Thiourea Nitroxyl Delivery Agents," \$250,448, 1/11997-12/31/2000.

Funded Extra-University Proposals (Co-PI or Collaborator):

1) National Institutes of Health (R33 CA126659-01), "Profiling of Redox Sensitive Signaling Proteins" Co-PI to Dr. Leslie Poole (WFU Biochemistry), \$300,000/3 years

2) National Institutes of Health, (R21 087891) "Nitric Oxide Donor Compounds for the Treatment of Hemolytic Conditions" Co-PI to Dr. Kim-Shapiro (WFU Physics), \$200,000/2 years

3) National Institutes of Health (R01CA129373) "Targeting the MSH2-Dependent Apoptotic Pathway," Collaborator to Dr. F. Salsbury, PI, (WFU Physics), \$30,000 1.2/academic 5/09-4/14

Completed

7) National Institutes of Health (R21 CA112145), "Profiling of Redox Sensitive Signaling Proteins, Co-PI to Dr. Leslie Poole (WFU Biochemistry), \$200,000/2 years

6) National Science Foundation, "Upgrade of a Single Crystal X-ray Diffractometer," Co-Principal Investigator, \$117,500, 1/03-1/04.

5) North Carolina Biotechnology Center, "Acquisition of an EPR Spectrometer," Co-Principal Investigator, \$137,250, 1/03-1/04.

4) North Carolina Biotechnology Center, "Acquisition of a LC/MS Spectrometer," Co-Principal Investigator, \$110,000, 1/01-1/02.

3) National Science Foundation, "Purchase of a 400 MHz NMR Spectrometer," Co-Principal Investigator, \$219,000, 7/97-6/98.

2) North Carolina Biotechnology Center, "Purchase of a 400 MHz Spectrometer," Co-Principal Investigator, \$150,000, 6/97-6/98.

1) American Heart Association, North Carolina Affiliate, "Molecular and Cellular Effects of Hydroxyurea in Sick Red Blood Cells," \$54,000, 1/1/98-12/31/00, Collaborator to Dr. Dany Kim-Shapiro, Principal Investigator, Wake Forest University, Department of Physics.

Funded Intra-University Proposals:

1) Wake Forest University Translational Science Institute, Dr. Karin Scarpinato, Department of Cancer Biology, Dr. Fred Salisbury, Department of Physics-collaborators "Drug Design for Targeted Chemotherapy," \$50,000, 1/08-1/10.

Completed

9) Wake Forest University, Bridge Funding Science Research Fund, \$10,000, 8/31/07-12/31/07.

8) Wake Forest University, Cross Campus Collaborative Research Support Fund, Dr. Charles Morrow, Department of Biochemistry-collaborator "Structural Requirements of Nitrated Fatty Acids-Natural Cellular Signaling Agents and Nitric Oxide (NO) Donors," \$20,000, 7/06-7/07.

7) Wake Forest University, Cross Campus Collaborative Research Support Fund, Dr. Leslie Poole, Department of Biochemistry-collaborator "Development of Sensitive Chemical Probes to Detect Biologically Significant Changes in the Cysteine Redox State of Target Proteins," \$15,000, 7/03-7/04.

6) Wake Forest University, Catalyst Award (with Dany Kim-Shapiro, Physics), "Biochemistry and Biophysics of Sick Cell S-Nitrosohemoglobin," \$50,000, 7/00-6/01.

5) Wake Forest University Comprehensive Cancer Center, "Carbohydrate Derived N-Hydroxyureas as Tumor Cell Specific Ribonucleotide Reductase Inhibitors and Nitric Oxide Delivery Agents," \$10,000, 1/00-12/00.

4) Wake Forest University, Science Research Fund, "Development of New Asymmetric N-O Heterodienophiles," \$2,500, 7/99-6/00.

3) Wake Forest University, Cross Campus Collaborative Research Support Fund, Dr. Joe Tobin, Department of Anesthesiology-collaborator "Synthesis and Characterization of Isoform Selective Inhibitors of Nitric Oxide Synthase," \$6,000, 7/98-7/99.

2) American Cancer Society, Bowman Gray School of Medicine Institutional Research Grant, "Development of a Nitroxyl Delivery System: Potential New Antitumor Agents," \$15,000, 11/96-11/97.

1) Wake Forest University-Research and Creative Activities Fund (RECREAC), "Synthesis and Evaluation of New Mannosidase Inhibitors from a Chiral Hydroxamic Acid," \$5,400, 7/1996-6/1997.

Research Experience with Students and Post Doctorals:

Graduate

14) Mai Shoman, Current Graduate Student, Egyptian CHANEL student

13) Julie Reisz, Current Student

12) Jenna Dumond, Current Student

11) Erika Bechtold, Current Student

10) Brad Poole, MS, 2008, "Simple Alkene Derived Nitro-Oximes as Nitric Oxide/Nitroxyl Donors," Medical Student, University of South Carolina

9) Ranjan Banerjee, Current Student

8) Xin Sha, Ph.D, 2006, "Hydrolysis of Acyloxy Nitroso Compounds Yields Nitroxyl (HNO)," post doctoral fellow, SUNY Buffalo.

7) Zhou Zou, Ph.D, 2005, "N-Hydroxyureas as New Nitric Oxide Delivery Agents," post doctoral, The Research Triangle Institute, Research Triangle Park, NC, 2005-present

- 6) Shuana Heyward, MS, 2003, "Synthesis and Evaluation of Non-Amino Acid Substrates and Inhibitors of Nitric Oxide Synthase" Clean Harbors Environmental Services, Reidsville, NC., 2003-2004, high school teacher, Dudley High School, Greensboro, NC, 2004-present.
 - 5) Xiaofeng Li, MS, 2000, "Synthesis and Evaluation of L-Canavanine Derivatives as Substrates and Inhibitors of Nitric Oxide Synthase," Abbott Laboratories, Chicago, IL.
 - 4) Roy Ware, Ph.D., 2000, "N-Phosphinoylnitroso Compounds: New N-O Heterodienophiles and Nitroxyl Delivery Agents," American Institutes of Chemists Graduate Student Award, 2000, post doctoral, The Research Triangle Institute, Research Triangle Park, NC, Serenex, Inc., Durham, NC.
 - 3) Yueping Xu, MS, 1999, "Chemical Oxidation of N-Hydroxyureas," BioRad, Inc. Walnut Creek, CA.
 - 2) Robert N. Atkinson, Ph.D., 1999, "Syntheses and Biochemical Analyses of L-Arginine Derivatives Designed to Interact With Nitric Oxide Synthase," American Institutes of Chemists Award, 1998, American Chemical Society, Division of Medicinal Chemistry Travel Award, 1998, post-doctoral The Research Triangle Institute, Research Triangle Park, NC. 1/99-1/00, ICAgen Pharmaceuticals, Research Triangle Park, NC.
 - 1) Bernadette Storey-Laubach, MS, 1997, "New Approaches Toward Nitroxyl (HNO) Production From Acyl Nitroso Compounds," Micell Technologies, Research Triangle Park, NC.
- Undergraduate
- 33) Leah Allen "Reactions of S-Nitrosothiols with Phosphines," Wake Forest University junior.
 - 32) Allison Faig "Nitrite Formation from Nitrofuran Based Antibiotics," Wake Forest University junior.
 - 31) Dan Russell, BS, 2009 "Preparation of Sulfinic Acid Traps of S-Nitrosothiols," Wake Forest University graduate
 - 30) Zach Engle, BA, 2008 "Synthesis of New Acyloxy Nitroso Compounds as HNO Donors," optometry school
 - 29) Kimberly Beam, BS, 2008 "Carbohydrate Derived Hydroxamic Acids as Anti-Cancer Agents," Wake Forest University Undergraduate Research Fellow, Summer 2007, medical student (Wake Forest University).
 - 28) Megan Wright, "Hydrazines as Potential HNO Donors," BA, 2009 "Catalase and Peroxidase Mediated Nitroxyl Formation," medical student (University of North Carolina).

- 27) Jennifer Lubbeck, BS, 2007 "Chemical Studies of Acyloxy Nitroso Compounds," graduate student in chemistry (University of Colorado).
- 26) Heather Lee, BS, 2006 "Nitric Oxide Release from Nitroalkenes," Wake Forest University, graduate.
- 25) Matt Meissner, BA, 2006 "Synthesis of Nitro Methyl Oleate and Evaluation of NO Donor Properties," Wake Forest Undergraduate Research Fellow, Summer 2005, medical student (University of Texas, San Antonio).
- 24) Scott Hardison, BA, 2005 "Synthesis of Carbohydrate Derived Hydroxamic Acids as Potential Anti-Cancer Agents," Wake Forest Undergraduate Research Fellow, Summer 2004, medical student (Wake Forest University).
- 23) Tyler Davis, BS, 2005, Lipscomb College "Synthesis of Carbohydrate Derived Hydroxamic Acids," graduate student in chemistry (Vanderbilt University).
- 22) Amanda Day, BS 2007 "Determination of Cysteine Thiol pKa's in *E. coli* Thioredoxin Using MALDI-TOF Mass Spectrometry," Wake Forest Undergraduate Research Fellow, Summer 2004 and 2005, graduate student, cancer biology (Duke University).
- 21) Ashley Feneran, BS, 2007 "Synthesis of Spontaneous Nitrite Donors," Wake Forest Undergraduate Research Fellow, Summer 2004 and 2005, Glaxo-Smith-Kline Undergraduate Research Fellowship, 2006, osteopathic medicine student (Midwestern University).
- 20) Robbie Fisher BA, 2004 "Synthesis of Dimedone Derivatives as Probes of the Redox State of Cysteine Residues in Proteins," Wake Forest University Undergraduate Research Fellow, Summer 2003, medical student (Wake Forest University).
- 19) Leigh Allen, BS, 2005, "Synthesis of Poly-Hydroxyureas as New Nitric Oxide Donors," Wake Forest University Undergraduate Research Fellow, Summer 2003, senior, graduate student in chemistry (Duke University).
- 18) Mark Sperry, BA, 2004 "Preparation and Evaluation of Polymeric Hydroxyureas as Nitric Oxide Donors"
- 17) Shannon Smith, BA, 2004 "Mechanism of Nitric Oxide Release from Hydroxyurea," medical student (Wake Forest University)
- 16) Elijah Bolin, BA, 2003 "Synthesis of Multimeric Uridine Oligonucleotides," medical student (Wake Forest University)
- 15) Michael Ellis, BS, 2002 "Ring Opening Metathesis Routes to New Heterocycles," Honors Thesis, Wake Forest University Undergraduate Research Fellow, Summer 2000, Glaxo-Wellcome

Undergraduate Research Fellowship, Summer 2001, PhD (University of North Carolina), post-doctoral, University of California Irvine.

14) Kelly Smith, BS, 2002 "Synthesis of Alternative Substrates for Nitric Oxide Synthase," Wake Forest University Undergraduate Research Fellow, Summer 2000, epidemiology graduate student (George Washington University).

13) Christina Bourgeois, BA, 2001, "Identification of S-Nitrosohemoglobin During the Reaction of Hydroxyurea and Hemoglobin," medical student (University of Florida).

12) Erin McGeehan, BS, 2001, "Horseradish Peroxidase Catalyzed Nitric Oxide Formation from Hydroxyurea," Honors Thesis, American Institutes of Chemists Award, 2000, PhD IUniversity of Pennsylvania), currently in law school.

11) Jeremy Rupon, BS, 2000, "Reaction of Hydroxyurea with Hemoglobin and Myoglobin," Honors Thesis, Wake Forest University Undergraduate Research Fellow, Summer 1998, Glaxo-Wellcome Undergraduate Research Fellowship, Summer 1999, American Institutes of Chemists Award, 2000, MD/PhD student (Virginia Medical College).

10) Regina Myers, BA, 2000 "Synthesis of Water Soluble Nitroxyl Delivery Agents," Wake Forest University Undergraduate Research Fellow, Summer 1999, biochemistry graduate student (Vanderbilt University).

9) Rebecca Kotacska, BA, Biology, 2000, "Ene Reactions of N-Phosphinoyl Nitroso Compounds", medical student (Wake Forest University).

8) Neil Jenkins, BS, 2000, "Oxidation of Hydroxamic Acids and N-Hydroxyureas with the Dess-Martin Periodinane," chemistry graduate student (Cornell University).

7) Christian Stevenson, BS, 1999, "Synthetic Approaches Towards Nitric Oxide Releasing Compounds," Honors Thesis, Glaxo-Wellcome Undergraduate Research Fellowship, Summer 1998 (declined), NSF Predoctoral Fellowship, American Institutes of Chemists Award, 1999, PhD (Harvard University), employed at Merck, Rahway, NJ.

6) Jeff Blackburn, BS, 1999, "Synthesis and Evaluation of Fluorine Containing Nitric Oxide Synthase Inhibitors," PhD (University of Colorado).

5) Challice Bonifant, BS, 1999, "Chemical Oxidation of Hydroxyurea," National Science Foundation, Research Experiences for Undergraduates, Summer 1997, Wake Forest University Undergraduate Research Fellow, Summer 1998, research assistant, National Cancer Institute (Dr. Larry Keefer), National Institutes of Health, MD/PhD student (Georgetown University).

4) Eric Palmer, BS, 1999, "Nitroxyl Production from L-Amino Acid Derivatives," National Science Foundation-Research Experience for Undergraduates, Summer 1996, Glaxo-Wellcome

Undergraduate Research Fellowship, Summer, 1997, First Lieutenant, United States Marine Corps.

3) Maria-Michelle Alavanja, BS, 1998, "Determination of the First Order Rate Constant for the Decomposition of 9,10-Dimethylanthracene-Acyl Nitroso Cycloadducts," American Institute of Chemists Award, 1998, neuroscience graduate student (University of Pennsylvania), NIH Training Grant pre-doctoral fellow, MD, 2004, Uniformed Services University.

2) Genichiro Yasaki, BS, 1997, "Structural Effects on the Decomposition of 9,10-Dimethylanthracene-Acyl Nitroso Cycloadducts," Kao Specialties Americas LLC., High Point, NC.

1) Veta Johnson, BS, 1998, Claflin College, "Nitroxyl Production from Acyl Nitroso Compounds Generated by Retro-Diels Alder Reactions," National Science Foundation-Research Experience for Undergraduates, Summer 1996, MS Chemistry (Ohio University); high school teacher.

Post Doctoral

9) Mike Gorczynski, 2005-2008, research scientist, Duke Small Molecule Synthesis Facility.

8) Harinath Chakripani, 2006, post-doctoral fellow, National Cancer Institute, (Larry Keefer).

7) Sarah Knaggs, 2005-2006, research facilitator, Oxford University, United Kingdom

6) Weibin Chen, 2004-2007, chemist, Chemgenx, Bordentown, NJ.

5) Jinming Huang, 2000-2007, American Institute of Chemists Award, 2003, assistant professor of chemistry, University of Arkansas-Monticello, AK.

4) Dennis Parrish, 2002-2004, American Institute of Chemists Award, 2004, research scientist, Degussa Chemical, Richmond VA.

3) Bubing Zeng, 2001-2004, post-doctoral fellow, Department of Pharmacy, University of North Carolina, assistant professor, School of Pharmacy, East China University of Science and Technology, Shanghai, China.

2) Richard Pennington, 2002-2003, assistant professor of chemistry, Saint Mary's College, Omaha, NE.

1) Shreeshaikumar Hadimani, 2000, research scientist, Sigma-Aldrich, Inc., Milwaukee WI.

Visiting Scientists

2) Janusz Skolimowski, Fall 2003, Fall 2004, Spring 2005, Summer 2006, Fall 2007, Professor, University of Łódź, Łódź, Poland.

1) Mamudu Yakubu, Summers 2002-2005, Professor, Elizabeth City State University, Elizabeth City, NC, NIH Minority Supplement Awardee. Currently, tenured faculty member at Winston-Salem State University, Winston-Salem, NC.

High School

2) Renne Connelly, "Metal Mediated Oxidation of Hydroxyurea," American Chemical Society Project SEED, Summer 1999, Wake Forest University

1) Melvernia Holly, "Stereochemical Investigation of the Oxidation of Hydroxamic Acids," American Chemical Society-Project SEED, Summer 1996, Wake Forest University.

Teaching Experience at Wake Forest University including Average Recommendation of Instructor from end of semester evaluations, 1 = excellent, 5 = poor, *1 = strongly agree that instructor was an effective educator, 7 = strongly disagree.

	Title	Number	Date	Students	Av. Rec.
37)	Organic Synthesis	724	Spring 2008	11	
36)	Organic Chemistry	122	Fall 2007	31	
35)	Organic Laboratory	122L	Fall 2007	31	
34)	Organic Laboratory	122	Spring 2007	46	
33)	Advanced Organic	721	Fall 2006	7	
32)	Chemical Literature	383/683	Fall 2006	13	
31)	Organic Chemistry	122	Spring 2006	35	1.77*
30)	Chemical Literature	383/683	Fall 2005	13	
29)	Organic Synthesis	724	Fall 2005	8	1.0*
28)	Advanced Organic	721	Fall 2004	3	1.0*
27)	Organic Laboratory	223L	Fall 2004	35	1.75*
26)	Organic Chemistry	122	Spring 2004	42	2.09*
25)	Organic Laboratory	223L	Fall 2003	31	2.03*
24)	Organic Synthesis	724	Fall 2003	4	1.0*
23)	Organic Synthesis	724	Spring 2002	7	1.0*
22)	Organic Chemistry Lab	221L	Fall 2001	38	1.5*
21)	Organic Chemistry	221	Fall 2001	32	2.30*
20)	Organic Synthesis	724	Spring 2001	7	1.0
19)	Organic Laboratory	221L	Fall 2000	40	1.70
18)	Organic Chemistry	221	Fall 2000	34	1.21
17)	Sp Topics in Biochemistry	351/651	Spring 2000	42	1.25
16)	Organic Laboratory	222L	Spring 2000	37	1.11
15)	Organic Laboratory	221L	Fall 1999	39	1.38
14)	Advanced Organic	721	Fall 1999	4	1.00
13)	Organic Synthesis	724	Spring 1999	4	1.25
12)	Organic Laboratory	222L	Spring 1999	43	1.21
11)	Organic Laboratory	221L	Fall 1998	45	1.25
10)	Organic Spectroscopy	725	Fall 1998	6	1.35
9)	Organic Laboratory	222L	Spring 1998	42	
8)	Organic Chemistry	221	Fall 1997	32	1.06
7)	Organic Laboratory	222L	Spring 1997	40	1.40
6)	Organic Synthesis	424	Spring 1997	6	1.00
5)	Organic Laboratory	221L	Fall 1996	15	
4)	Advanced Organic	421	Fall 1996	12	
3)	Organic Laboratory	222L	Spring 1996		
2)	Organic Chemistry	222	Spring 1996	36	1.50
1)	Organic Chemistry	221	Fall 1995	45	1.58

Departmental Activities:

Chemistry Department Graduate Committee, 2009-
Organic Chemistry Search Committee, 2009
Biological Chemistry Search Committee, 2007
Chemistry Department Graduate Program Director, 2004-2008
Organic Chemistry Search Committee, Chair, 2004
Biological Chemistry Search Committee, Chair, 2004
Long Range Planning Committee, Chair, 2003-2004
Biochemistry Major Planning Committee, 2003-2006
Biochemistry Search Committee, Chair, 2001
Academic Computing Specialist Search Committee, 2001
Chemistry Department Graduate Program Director, 2000-2002
Instrumentation Purchasing Committee (IR/UV), 2000
Organic Search Committee, 1999
Biochemistry Search Committee, 1999
Chemistry Department Graduate Committee, 1996-2000
Chemistry Department Academic Computing Committee, 1998-2000
Campus Day Representative, Chemistry Department, Spring 1998
Chemistry Department Seminar Coordinator, Spring 1997, 2002
National Science Foundation-REU Selection Committee, 1996-1997

University Activities:

Biological Safety Committee, 2009-present
Shared Resource Core Committee, 2008-present
Athletics Committee, 2003-2006
Cross Campus Graduate Education Opportunities Committee, 2000-2001
Richter Scholarship Selection Committee, 2000-2003
University Honors Committee, 1999-2000
Freshman Advisor, Wake Forest University, 1996-2000

Community Activities:

South Stokes Youth Soccer Coach, 2003-2009
South Stokes Youth Soccer Board, 2005-present
South Stokes Youth Soccer President-2008
Stokes County Habitat for Humanity Board-2005-2007